

16bit DIGITAL SYNTHESIZER (MODULE)

**K4/K4r**

**SERVICE MANUAL**

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**KAWAI**

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Kawai Musical Instrument  
Manufacturing Co., Ltd.

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## 1. P.W.B. INFORMATION

K4

P.W.B. Name	Code No.	Description
MI-051 (1) : Japan 110V Markets 220/240V Markets (2) : U.S.A., Canada (3) : Australia, U.K., West Germany Europe	236283  236284 236285	MI-051 : MPU, CARD BUFFER, RESET, RAM, CODE ROM, ADDRESS DECODER, DCO, DCA, KEY SCAN, VELOCITY SENSOR, WAVE ROM, DCF, EFFECT, PAN POT, LINE GATE, MIDI, AUDIO, D/A, POWER SUPPLY
MI-052-055 (1) : All Markets	236286	MI-052 : PRESSURE SENSOR MI-053 : VOLUME MI-054 : DATA ENTRY (VALUE) MI-055 : PANEL SWITCHES

K4r

P.W.B. Name	Code No.	Description
MI-056-059 (1) : Japan 110V Markets 220/240V Markets (2) : U.S.A., Canada (3) : Australia, U.K., West Germany Europe	236290  236291 236292	MI-056 : MPU, CARD BUFFER, RESET, RAM, CODE ROM, ADDRESS DECODER, DCO, DCA, WAVE ROM, DCF, PAN POT, MIDI, AUDIO, D/A, POWER SUPPLY MI-057 : PANEL SWITCHES MI-058 : VOLUME MI-059 : DATA ENTRY (VALUE)

## 2. SEMICONDUCTORS LIST

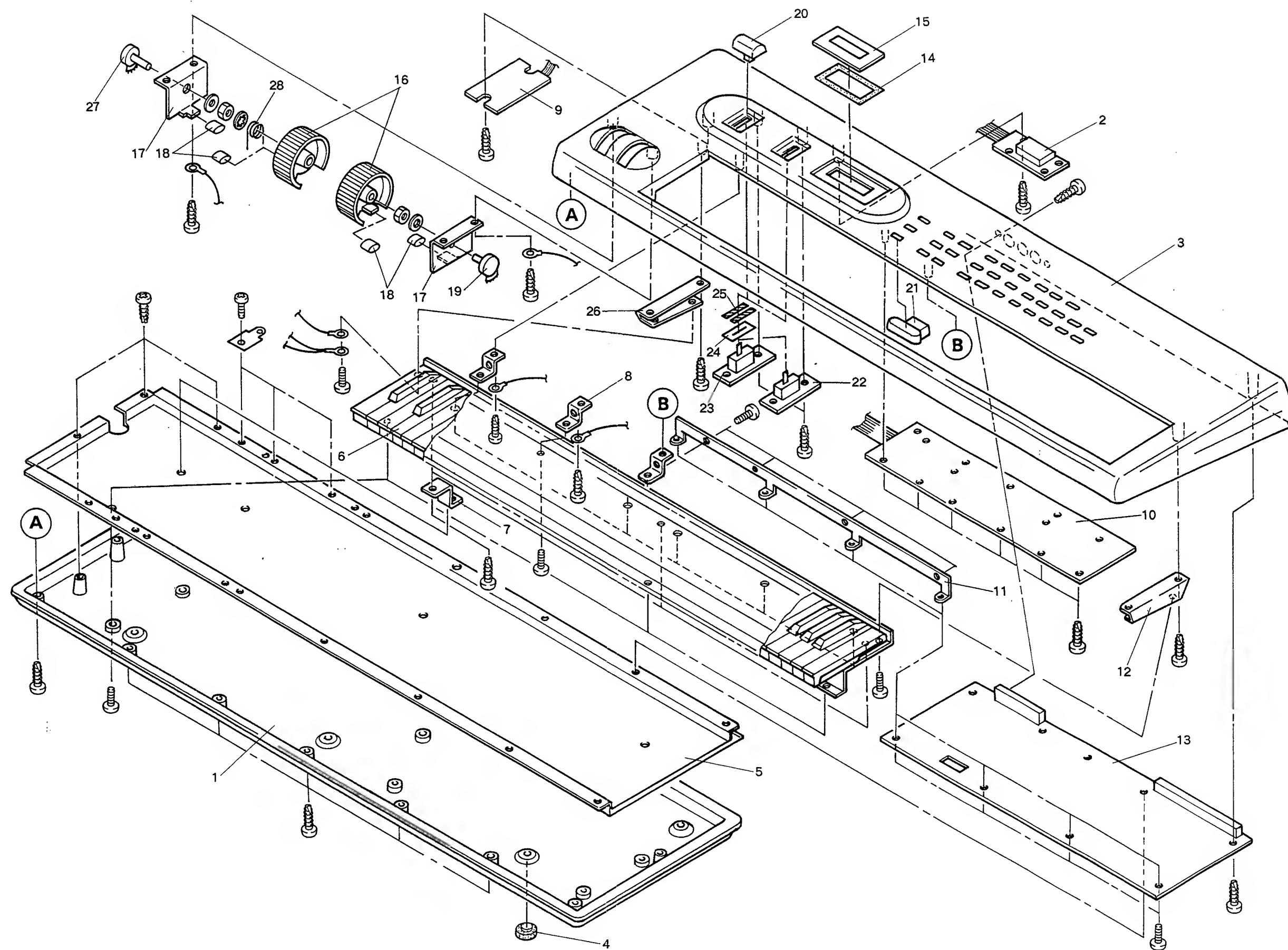
	Code No.	Name	Description	K4 Pieces	K4r Pieces
IC	706939	SN74LS138	3-To 4 Line Decoder	1	
	706990	TA75558P	Dual OP AMP		3
	707019	NJM-4556D	Dual OP AMP	1	1
	801926	TC74HC08	Quad 2-Input AND Gate	1	1
	802832	MSM74HC04	Hex Inverter	1	3
	802835	MSM74HC139	Dual 2-To 4 Line Decoder	1	1
	802837	MSM74HC174	Hex D-Type Flip Flop	1	3
	802838	MSM74HC244	Octal 3-State Bus Buffer	2	2
	802842	MSM74HC373	Octal D-Type Latch with 3-State Output		1
	802931	MSM74HC02	Quad 2-Input NOR Gate	1	
	802935	MSM74HC245	Octal 3-State Bus Transceiver	1	1
	803005	MSM74HC00	Quad 2-Input NAND Gate	1	5
	804981	74HC4538	Dual Monostable Multivibrator	1	
	804982	MB3771	Reset	1	1
	804984	TA7508P	Quad OP AMP	1	1
	804986	PD78310G-36	Micro Processing Unit	1	1
	805043	TA75358P	Dual OP AMP	2	
	805065	HM62256LP-15SL	8 × 32Kbits SRAM	1	1
	805129	TC74LS03	Quad 2- input NAND Gate with Open Collector Output	1	1
	805727	TLP513	PHOTO Coupler	1	1
	805758	K005FP : FP64P	Key Scanner	1	
	805759	K007FP : FP100P	EFFECTOR	1	
	805760	TC51832SP-12	8 × 32Kbits PSRAM	2	
	805823	K002FP : FP100P	Tone Generator	2	2
	805979	K004FP : FP80P	Pan Pot	1	1
	805980	K008FP : FP80P	Digital Filter	1	1
	805981	PCM66P : FP20P	D/A Converter	1	4
	805982	MC7809CT	Regulator	1	1
	805983	PC78L05J	Regulator	1	1
	919345	TC534000P MASKROM : P202	8 × 512Kbits MASK ROM	1	1
	919350	TC534000P MASKROM : P203	8 × 512Kbits MASK ROM	1	1
	919355	TC534000P MASKROM : P204	8 × 512Kbits MASK ROM	1	1
	919360	27C512-20 EPROM : P206	8 × 64Kbits EPROM ROM	1	
	919685	27C512-20 EPROM : P207	8 × 64Kbits EPROM ROM		1
Transistor	802508	2SC3331T	SiNPN : Epitaxial Planar Type	1	1
	805984	2SD1468SR		2	8
	805985	RN1202		1	
	806089	DTC114ES			1
Fet	805986	2SK371GR		2	8
Diode	800625	1SS133		33	32
	805987	HPG06D		2	2
	805988	MA700		5	3
Zenor	805989	HZS4A-LL		1	8
Diode	806200	HZS3C3		1	
Crystal	803422	AT-51B	12MHz	1	1

## 3. PARTS LIST For K4

K4

No.	Code No.	Name	Pieces	Country
	803349	AC Adapter PS-121 D	1	Japan
	803350	AC Adapter PS-121 U	1	U.S.A., CSA, 110V Markets
	803351	AC Adapter PS-121 N	1	200V Markets
	803352	AC Adapter PS-121 S	1	Australia
	804351	AC Adapter PS-121 G	1	U.K., 220/240V Markets
	804504	AC Adapter PS-121 W	1	West Germany
	803363	Power Jack	1	All Markets
	805123	Fuse TSC 1A 250V	1	Japan
	803622	Fuse MT4 1A 250V	1	U.S.A., Canada
	803628	Fuse SET 1A	1	Europe
	805000	Jack	3	All Markets
	805736	MIDI Connector	1	All Markets
	806046	Lithium Battery	1	All Markets
	805439	Power Supply Switch	1	All Markets
1	806017	Lower Case	1	All Markets
2	806008	LCD : DMC16205-NY-LY1	1	All Markets
3	806016	Upper Case	1	All Markets
4	806023	Rubber leg	5	All Markets
5	919380	Lower Base	1	All Markets
6	805040	Keyboard (61keys)	1	All Markets
7	915435	Keyboard support metal	3	All Markets
8	915430	Fixing metal for panel	6	All Markets
9	236286	MI-052 (1)	1	All Markets
10	236286	MI-055 (1)	1	All Markets
11	919385	Fixing metal for Main P.W.B.	1	All Markets
12	915405	Fixing metal for Keyboard (R)	1	All Markets
13	236283	MI-051 (1)	1	Japan, 110/220/240V
	236284	MI-051 (2)	1	U.S.A., Canada
	236285	MI-051 (3)	1	Australia, U.K, West Germany
14	805341	LCD tape	1	All Markets
15	804967	LCD cover	1	All Markets
16	805037	Wheel 3	2	All Markets
17	915415	Fixing metal for wheel	2	All Markets
18	805038	Rubber for stopper	3	All Markets
19	805995	Volume : RK163110 50K	1	All Markets
20	806018	Volume knob	2	All Markets
21		Knob 1	3	All Markets
		Knob 2	4	All Markets
		Knob 4	5	All Markets
22	236286	MI-054 (1)	1	All Markets
23	236286	MI-053 (1)	1	All Markets
24	806201	S.V. cover	2	All Markets
25	803498	Scotch tape	4	All Markets
26	915410	Fixing metal for Keyboard (L)	1	All Markets
27	805996	Volume T(C,T):RK163110 50K	1	All Markets
28	915955	Wheel spring 3	1	All Markets

# 4. DISASSEMBLY DRAWING For K4

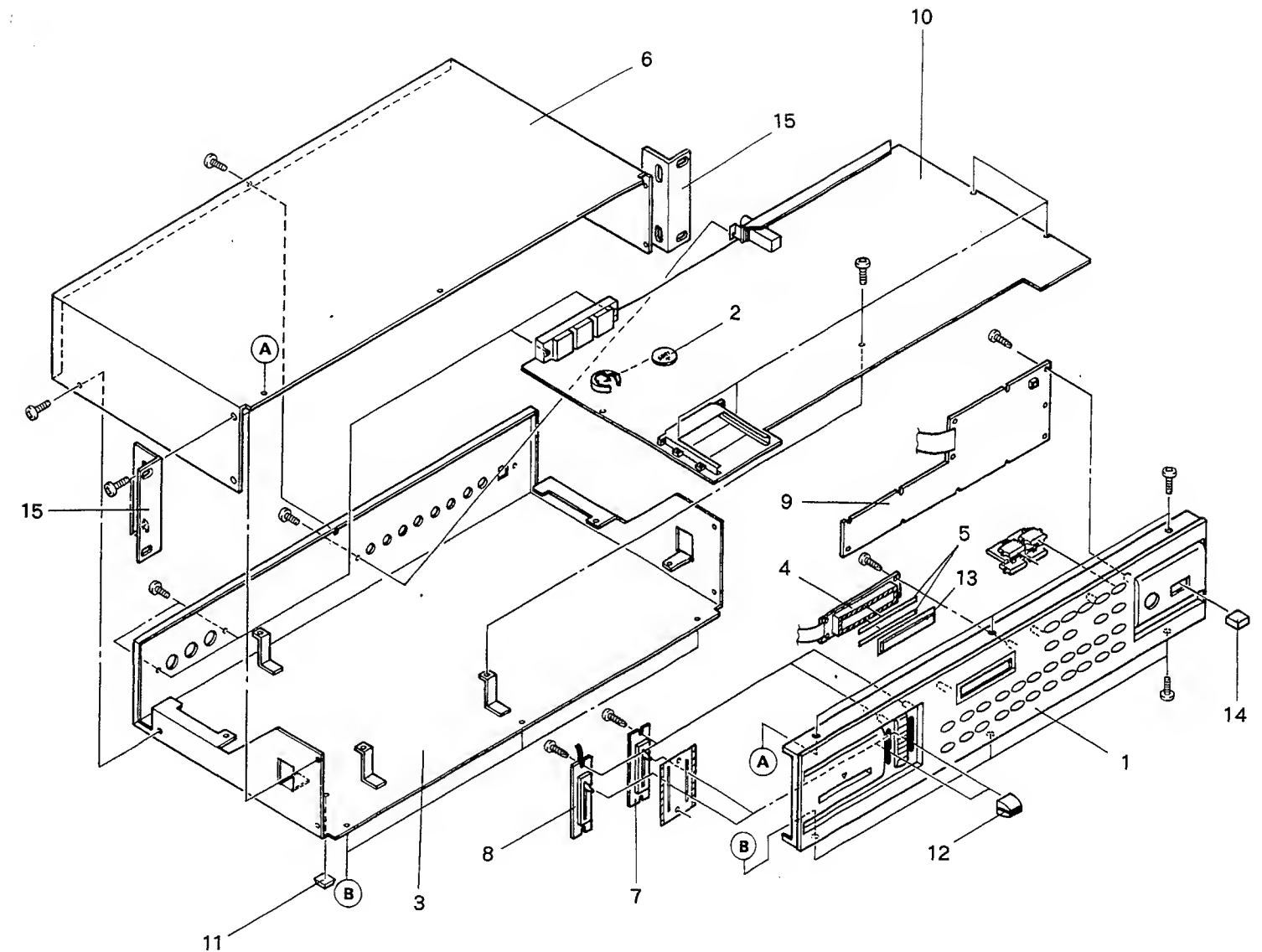


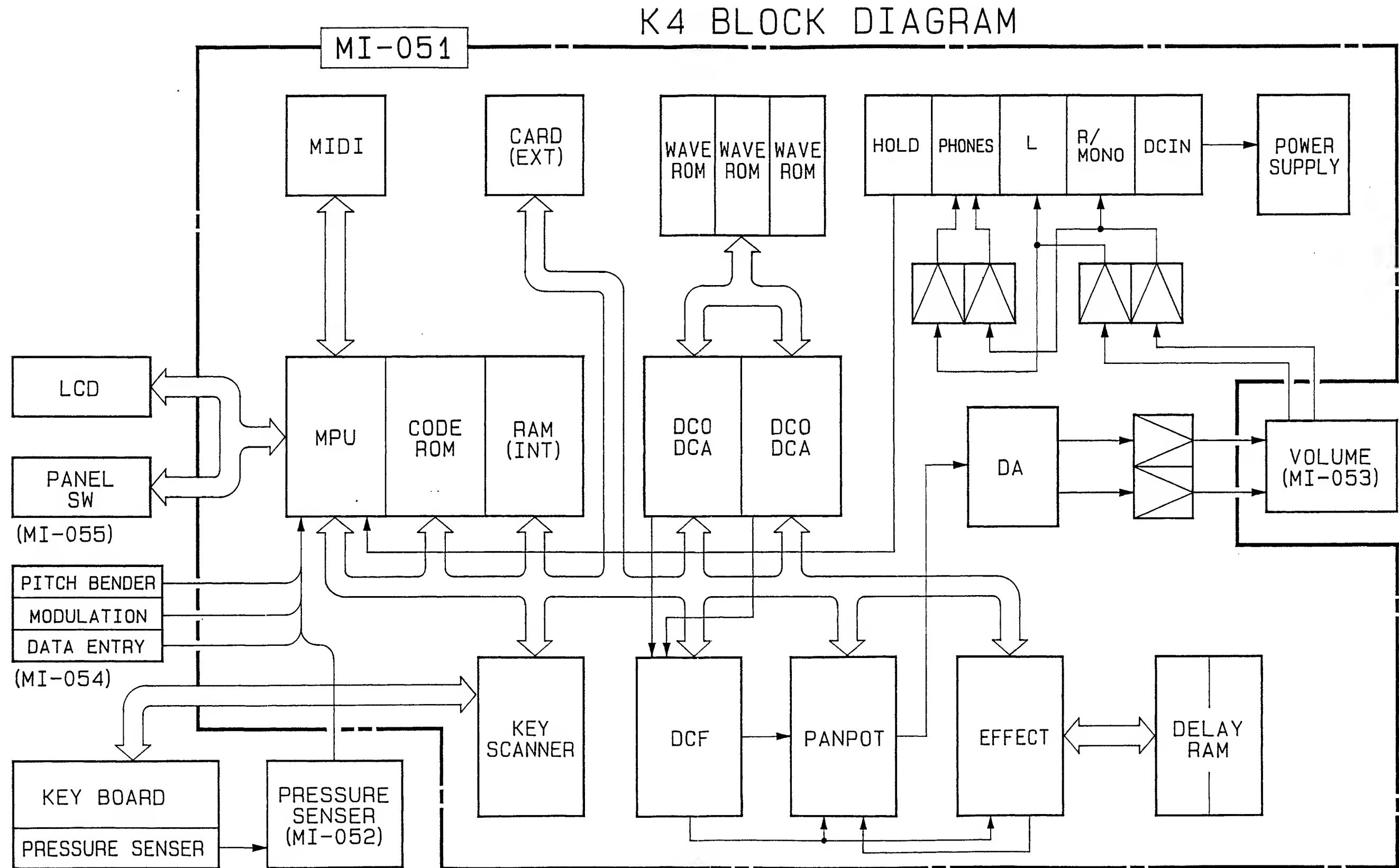
## 5. PARTS LIST For K4r

K4r

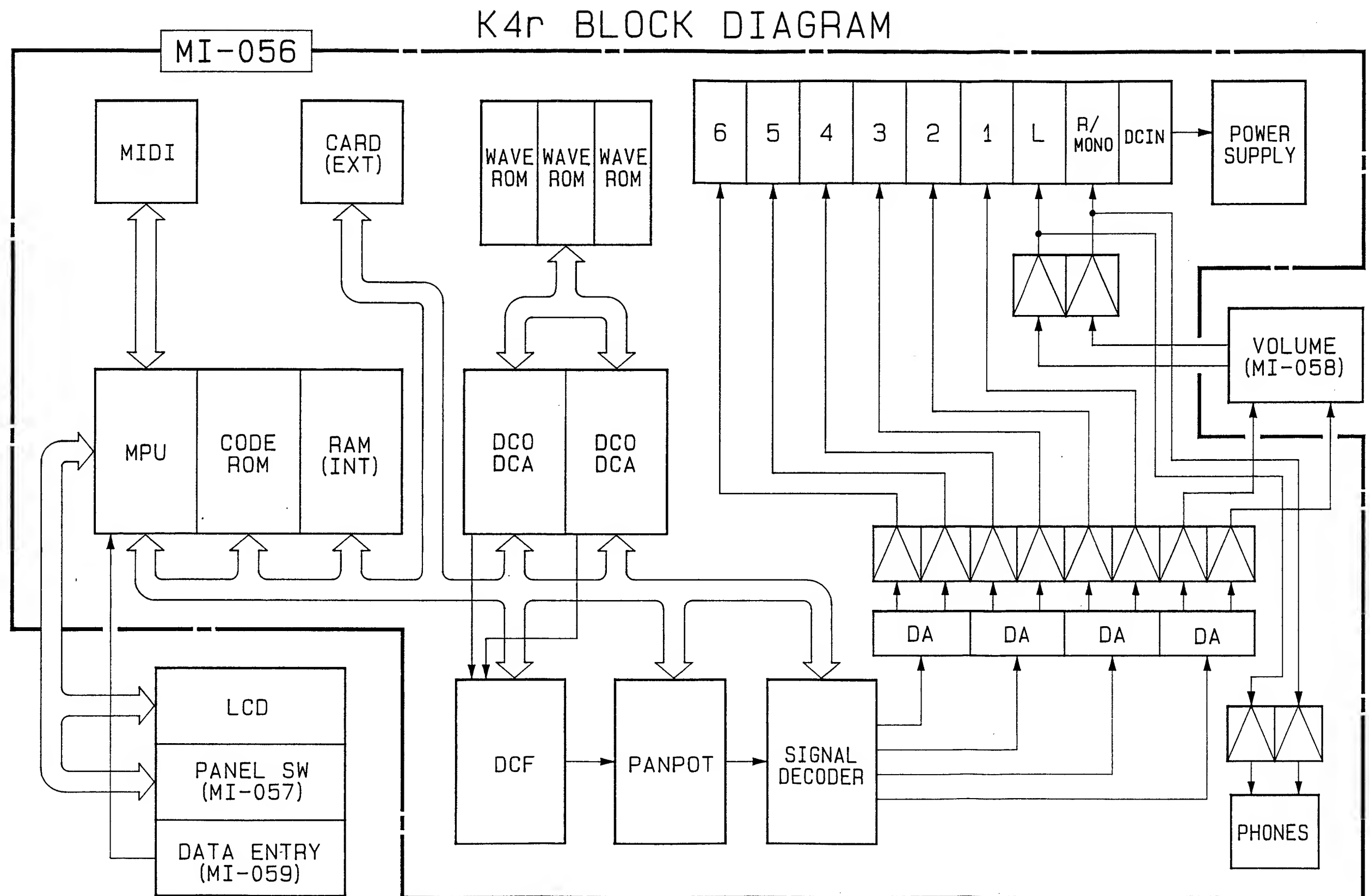
No.	Code No.	Name	Pieces	Country
	803349	AC Adapter PS-121 D	1	Japan
	803350	AC Adapter PS-121 U	1	U.S.A., CSA, 110V Markets
	803351	AC Adapter PS-121 N	1	200V Markets
	803352	AC Adapter PS-121 S	1	Australia
	804351	AC Adapter PS-121 G	1	U.K., 220/240V Markets
	804504	AC Adapter PS-121 W	1	West Germany
	803363	Power Jack	1	All Markets
	805123	Fuse TSC 1A 250V	1	Japan
	803622	Fuse MT4 1A 250V	1	U.S.A., Canada
	803628	Fuse SET 1A	1	Europe
	805000	Jack	8	All Markets
	805736	MIDI Connector	1	All Markets
	806070	Power Supply Switch	1	All Markets
1	806072	Front panel	1	All Markets
2	806046	Lithium Battery : CR2032	1	All Markets
3	919695	Lower Case	1	All Markets
4	806071	LCD : DMC16205-NY-LY1	1	All Markets
5	803501	Scotch tape	2	All Markets
6	919690	Upper Case	1	All Markets
7	236290	MI-059 (1)	1	Japan, 110/220/240V
	236291	MI-059 (2)	1	U.S.A., Canada
	236292	MI-059 (3)	1	Australia, U.K., West Germany
8	236290	MI-058 (1)	1	Japan, 110/220/240V
	236291	MI-058 (2)	1	U.S.A., Canada
	236292	MI-058 (3)	1	Australia, U.K., West Germany
9	236290	MI-057 (1)	1	Japan, 110/220/240V
	236291	MI-057 (2)	1	U.S.A., Canada
	236292	MI-057 (3)	1	Australia, U.K., West Germany
10	236290	MI-056 (1)	1	Japan, 110/220/240V
	236291	MI-056 (2)	1	U.S.A., Canada
	236292	MI-056 (3)	1	Australia, U.K., West Germany
11	806083	Foot (black)	4	All Markets
12	806080	Volume knob	2	All Markets
13	806081	LCD cover	1	All Markets
14	802715	Knob (black)	1	All Markets
15	909630	Rack Adapter	2	All Markets

## 6. DISASSEMBLY DRAWING For K4r





8. K4r BLOCK DIAGRAM





A

B

C

D

E

F

G

H

I

## 9. MI-051 PRINTED WIRING BOARD For K4

6

5

4

3

2

1

0

6

5

4

3

2

1

0

LCD MODULE	GND	15
	+5	14
	VEF	13
	RSEL	12
	R/W	11
	ECLK	10
	PD0	9
	PD1	8
	PD2	7
	PD3	6
	PD4	5
	PD5	4
	PD6	3
	PD7	2
	K	1

MI-055	PA0	12
	PA1	11
	PA2	10
	PA3	9
	PD7	8
	PD6	7
	PD5	6
	PD4	5
	PD3	4
	PD2	3
MI-052	+9	4
	AN3	3
	+5	2
MI-054	+5	3
	AN0	2
PITH BENDER MODULATION WHEEL	+5	7
	P36	6
MI-053	1	LS
	2	LR
MI-053	3	LG
	4	RG
MI-053	5	RR
	6	RS

MI-052	+9	4
	AN3	3
	+5	2
MI-054	+5	3
	AN0	2
PITH BENDER MODULATION WHEEL	+5	7
	P36	6
MI-053	1	LS
	2	LR
MI-053	3	LG
	4	RG
MI-053	5	RR
	6	RS

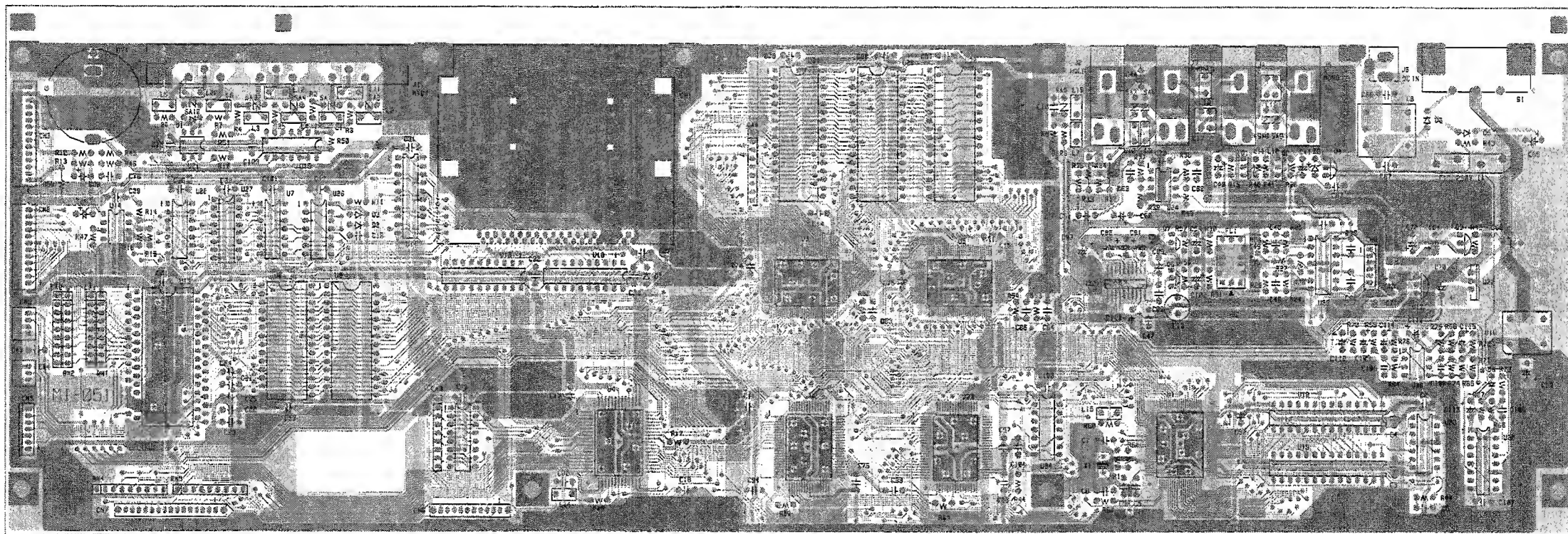
MI-054	+5	3
	AN0	2
PITH BENDER MODULATION WHEEL	+5	7
	P36	6
MI-053	1	LS
	2	LR
MI-053	3	LG
	4	RG
MI-053	5	RR
	6	RS

MI-054	+5	3
	AN0	2
PITH BENDER MODULATION WHEEL	+5	7
	P36	6
MI-053	1	LS
	2	LR
MI-053	3	LG
	4	RG
MI-053	5	RR
	6	RS

< CN7 >																													
KD20	15	KD11	14	KD21	13	KD12	12	KD22	11	KD13	10	KD23	9	KD14	8	KD24	7	KD15	6	KD25	5	KD16	4	KD26	3	KD17	2	KD27	1
KEY BOARD																													

< CN6 >																			
KA0	10	KA1	9	KA2	8	KA3	7	KA4	6	KA5	5	KA6	4	KA7	3	KA8	2	KA9	1
KEY BOARD																			

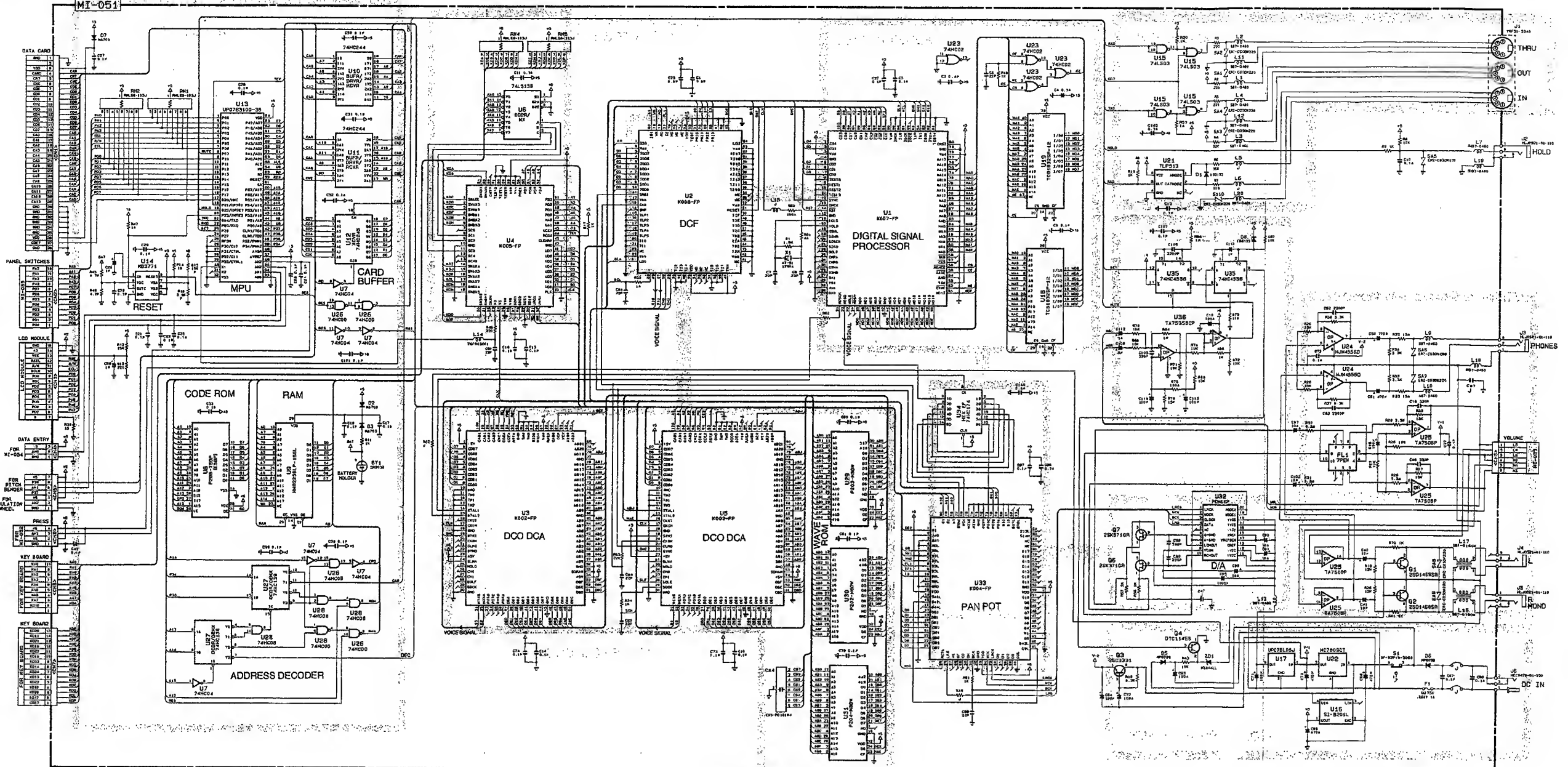
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
GND	VDD	CARD	CRT	CWE	CDE	CD0	CD1	CD2	CD3	CD4	CD5	CD6	CD7	CD8	CA0	CA1	CA2	CA3	CA4	CA5	CA6	CA7	CA8	CA9	CA10	CA11	CA12	CA13	GND	GND	GND	GND	GND	GND	VDD	CDDET	GND
< CN1 >																																					



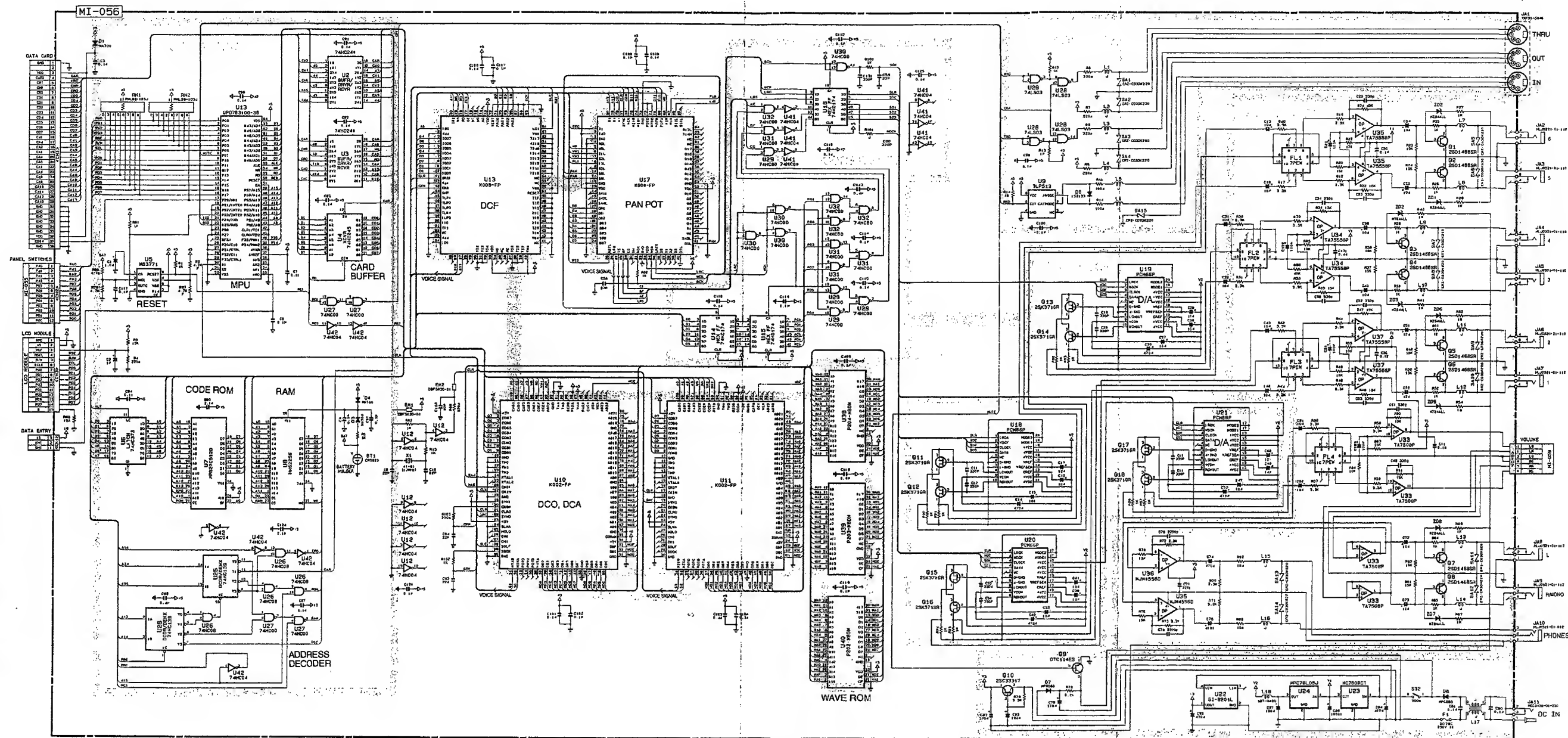
1	LS
2	LR
3	LG
4	RG
5	RR
6	RS



# 10. MI-051 CIRCUIT For K4



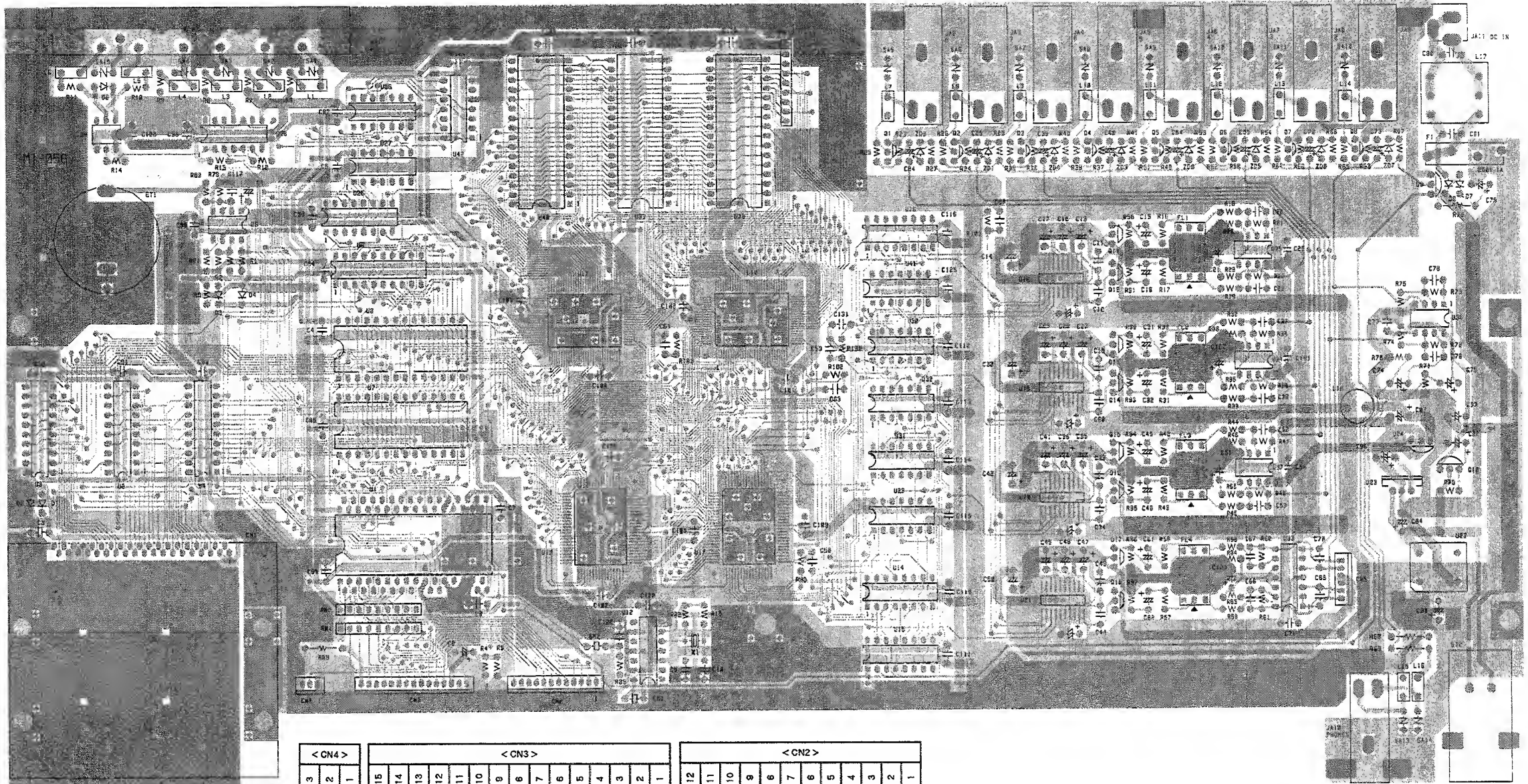
# 11. MI-056 CIRCUIT For K4r





A B C D E F G H I

12. MI-056 PRINTED WIRING BOARD For K4r



< CN4 >			
3	2	1	
+5	AN0	GND	
MI-054			

< CN3 >														
K	PD7	PD8	PD5	PD4	PD3	PD2	PD1	PD0	ECLK	R/W	RSEL	VEF	+5	GND
LCD MODULE														

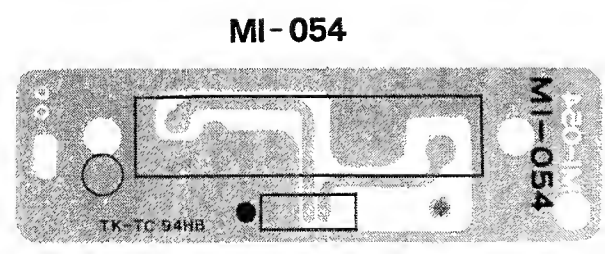
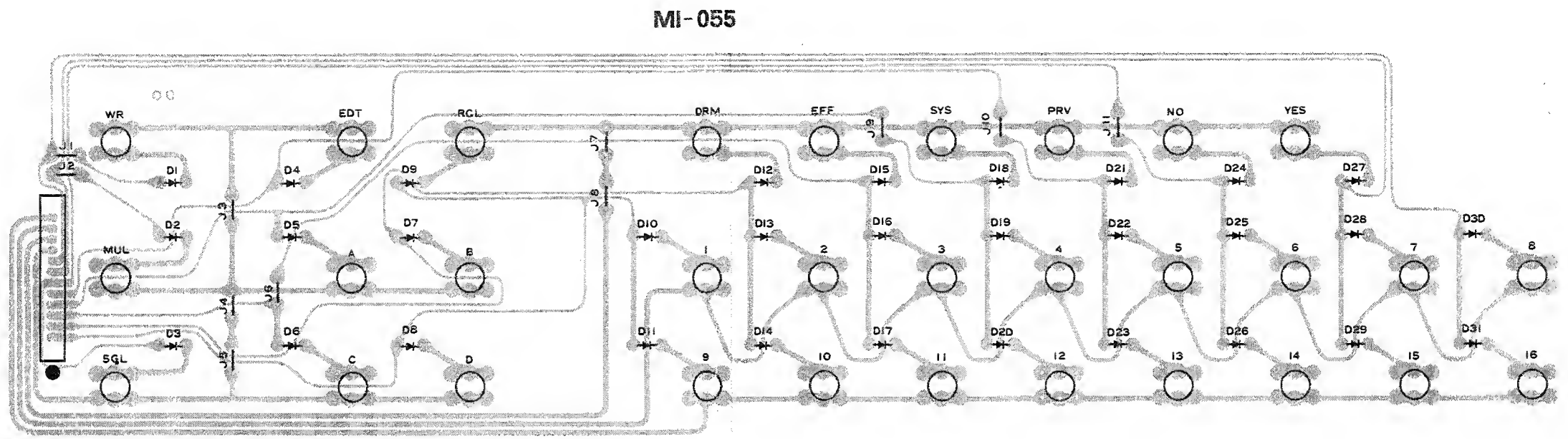
< CN2 >											
PD0	PD1	PD2	PA2	PD3	PD4	PD5	PD6	PD7	PA3	PA1	PA0
MI-055 < CN2 >											

< CN1 >																																					
38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
GND	ODET	VDD	GND	GND	GND	GND	GND	GND	CA13	CA12	CA11	CA10	CA8	CA7	CA6	CA5	CA4	CA3	CA2	CA1	CA0	CD7	CD6	CD5	CD4	CD3	CD2	CD1	CD0	CDE	CWE	CRT	CARD	VDD	GND	GND	

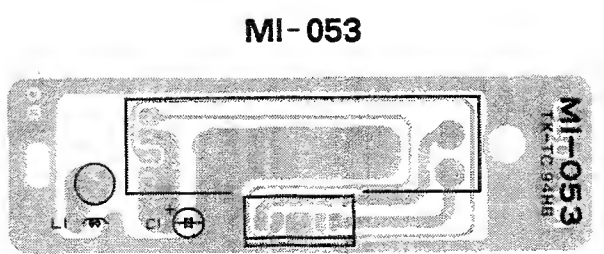
1	LS	MI-056
2	LR	
3	LG	
4	RG	
5	RR	
6	RS	

13. MI-052, 053, 054, 055 PRINTED WIRING BOARDS

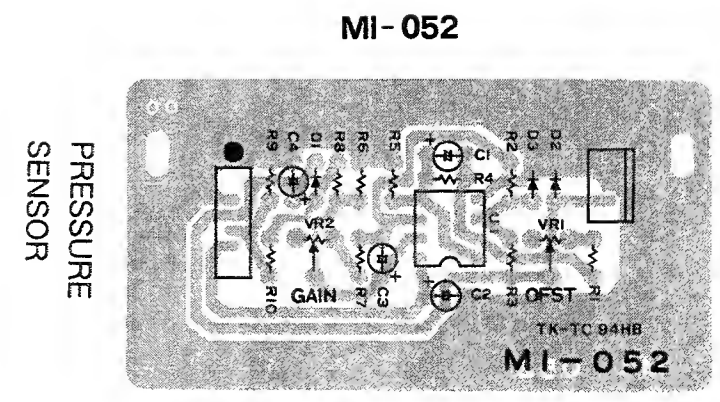
PA0	12
PA1	11
PA2	10
PA3	9
PD7	8
PD6	7
PD5	6
PD4	5
PD3	4
PD2	3
PD1	2
PD0	1



< CN >		
1	2	3
GND	AN0	+5
MI-057		
< CN4 >		

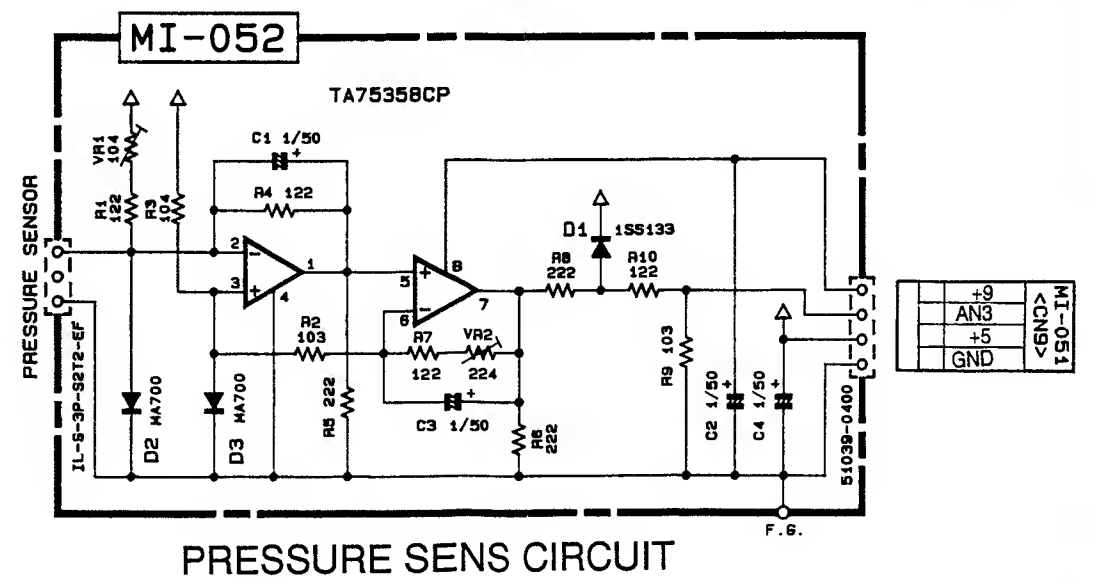
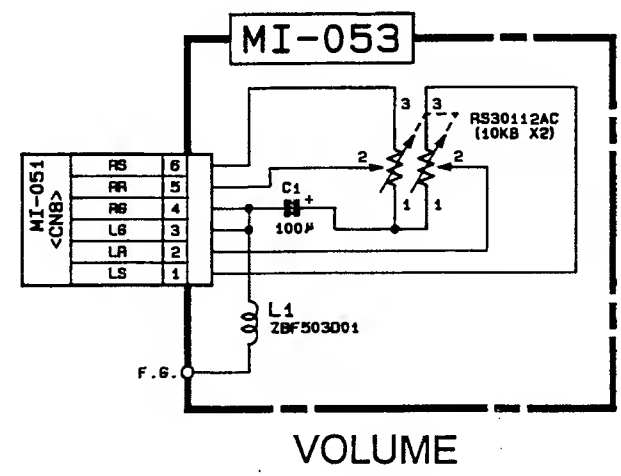
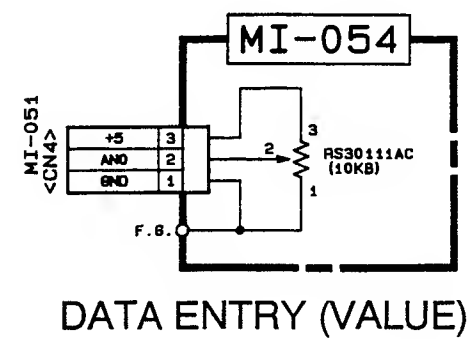
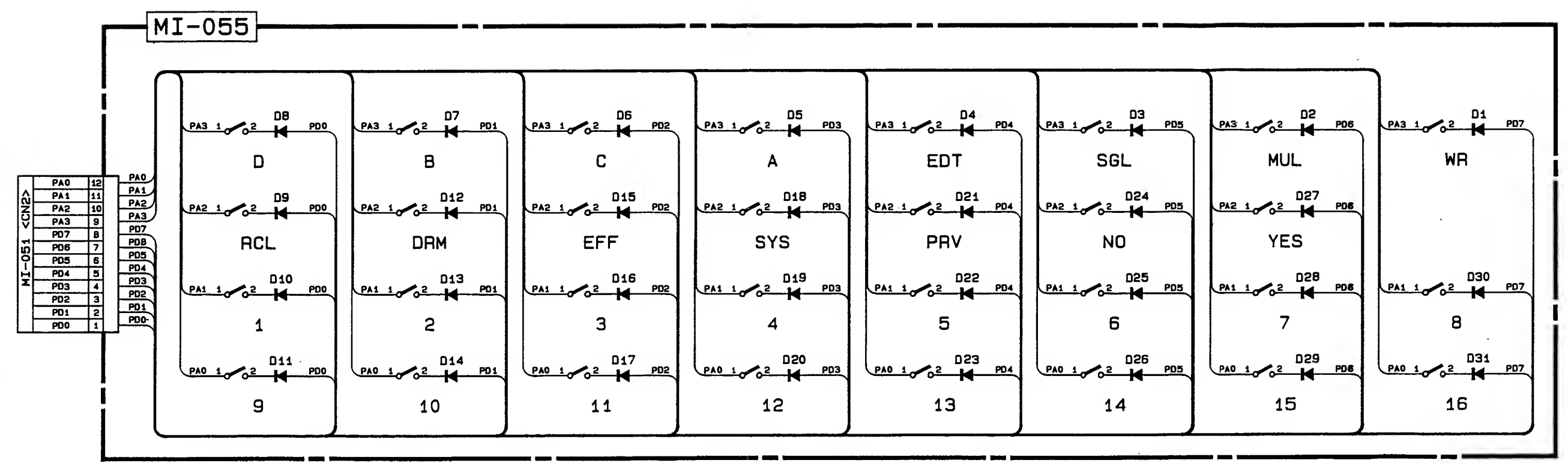


< CN >					
1	2	3	4	5	6
LS	LR	LG	RG	RR	RS
MI-051 < CN6 >					



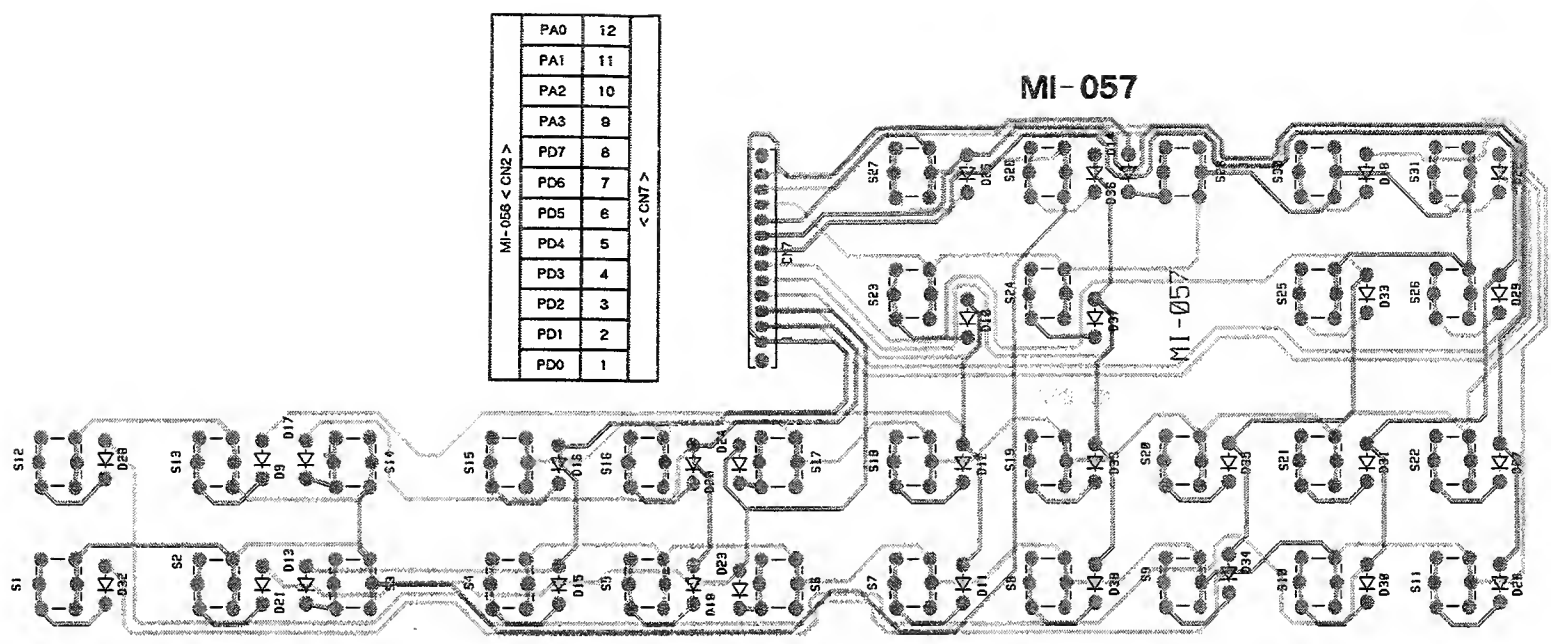
+5
AN3
+5
GND

14. MI-052, 053, 054, 055 CIRCUITS





15. MI-057, 058, 059 PRINTED WIRING BOARDS

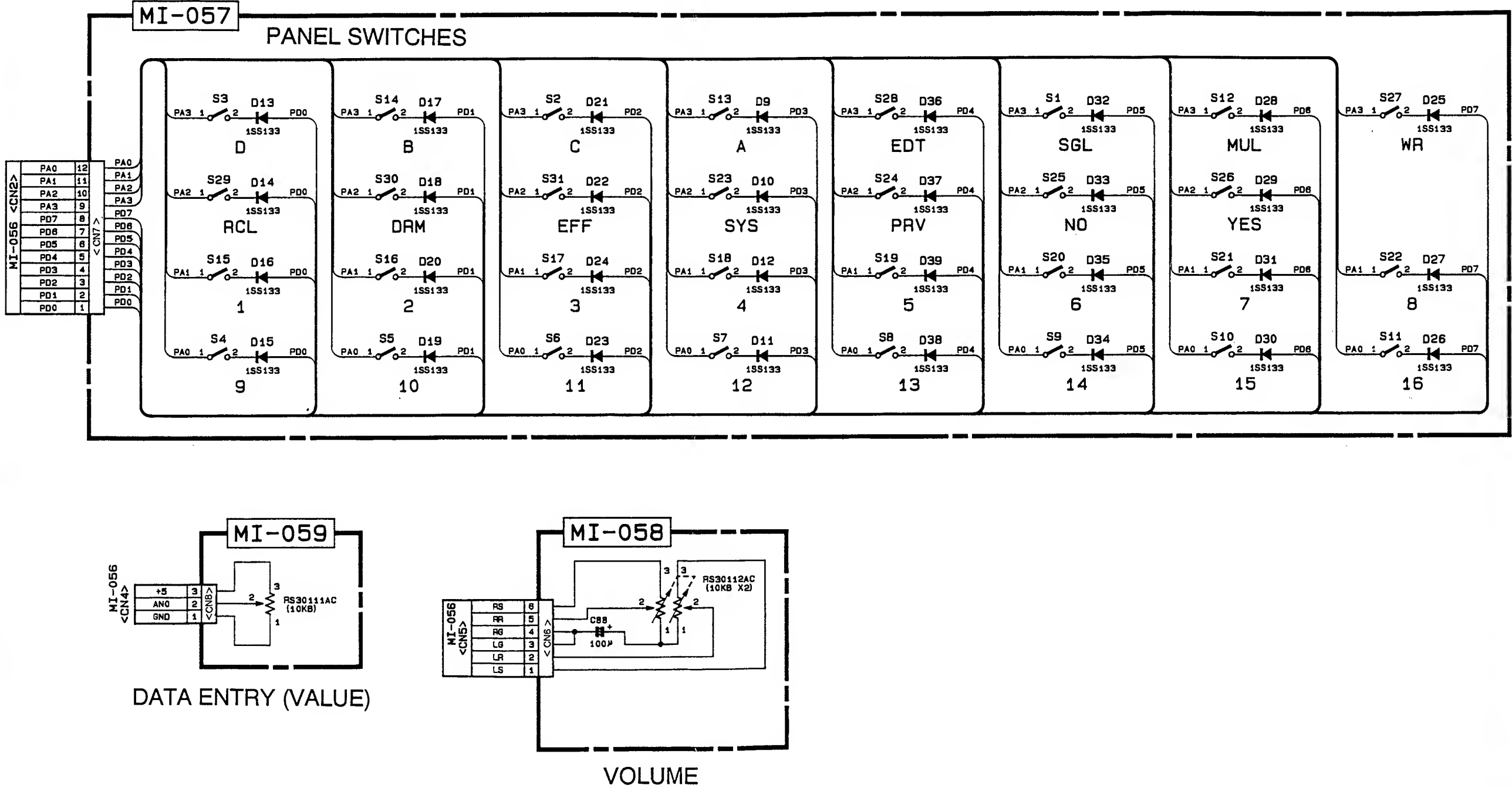


PA0	12
PA1	11
PA2	10
PA3	9
PD7	8
PD6	7
PD5	6
PD4	5
PD3	4
PD2	3
PD1	2
PD0	1

1	LS
2	LR
3	LG
4	RG
5	RR
6	RS

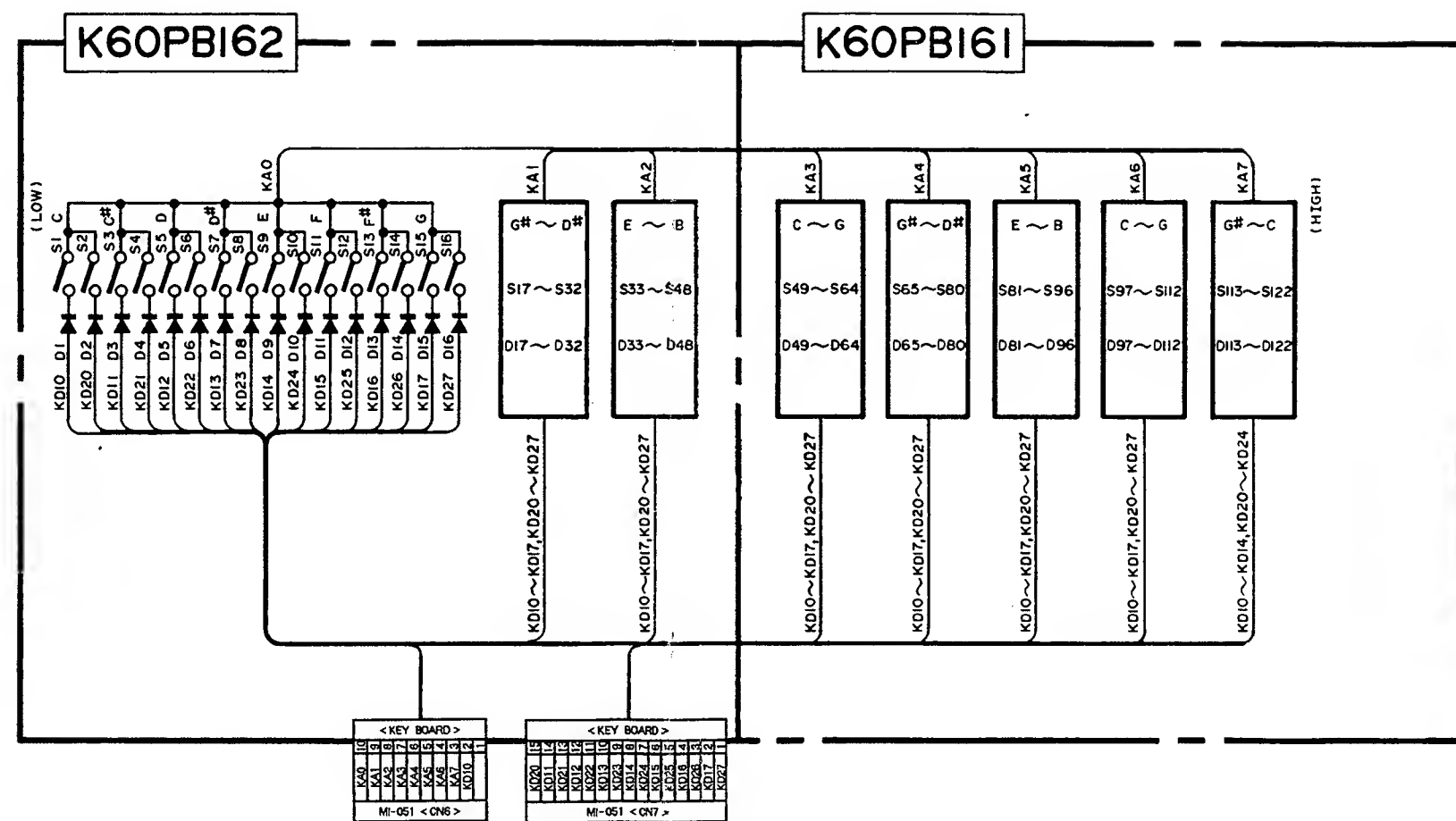
3	2	1
+5	AND	GND

16. MI-057, 058, 059 CIRCUITS



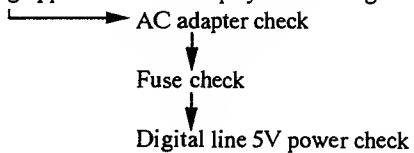


17. K60PB161, 162 (KEYBOARD) CIRCUITS

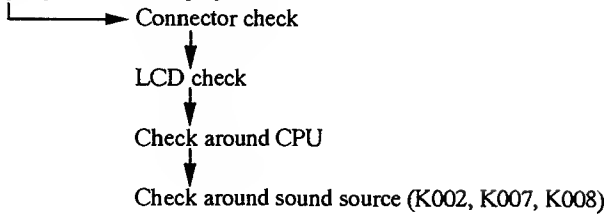


## 18. TROUBLESHOOTING

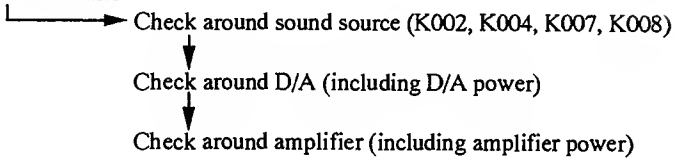
① Nothing appears on LCD display and backlight.



② Backlight goes on but display is abnormal.

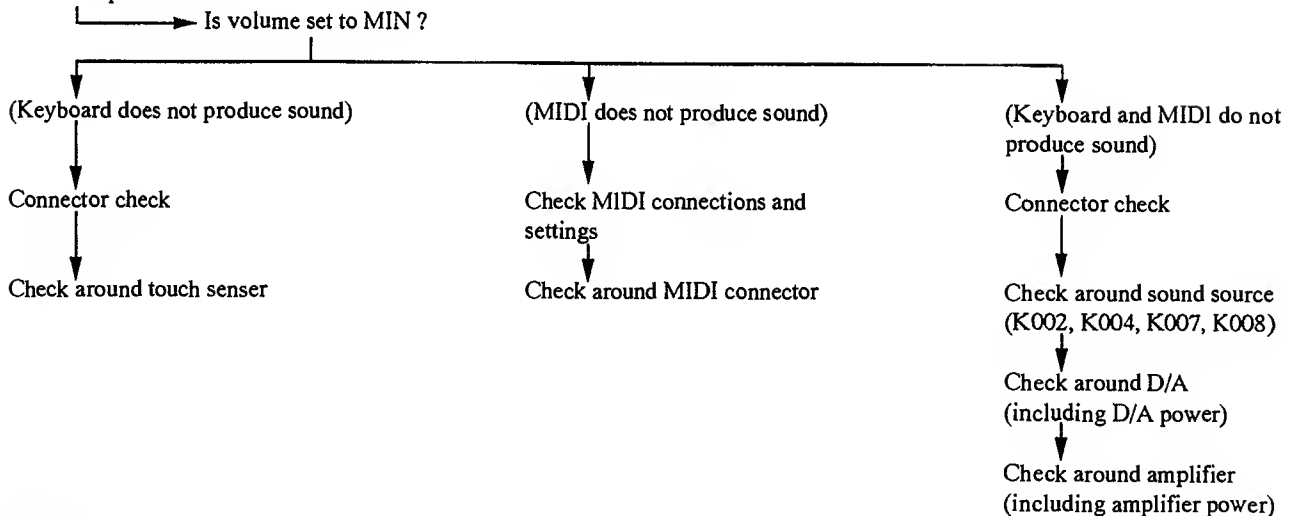


③ Sound is abnormal.



④ (Only K4)

No sound produced.



④ (Only K4r)

No sound produced.

